

iSchools in developing countries: Developing a telecommunications program for the Republic of Kosovo

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ABSTRACT

This paper describes a collaborative project between the University of Pittsburgh and the University of Pristina in building a program of study in telecommunications in Kosovo. This has not only been a notable service project for the University of Pittsburgh, it is also a way to begin extending the iSchool concept into developing economies like Kosovo.

Categories and Subject Descriptors

A.m (Miscellaneous)

General Terms

Management, Economics, Legal Aspects.

Keywords

Kosovo, USAID,

1. INTRODUCTION

In the wake of the destructive war of the late 1990s, the newly independent state of Kosovo still has many needs. Among them is a modern telecommunications infrastructure and career opportunities for the many young people who are unemployed. Telecommunications is a key infrastructure for any country wishing to be competitive in the global economy, and education is an important factor in building a competitive workforce that will stimulate investment in Kosovo.

In addition to capital investment, building a telecommunications infrastructure requires operational expertise and an educated workforce. In their November, 2007 assessment [1], the US Agency for International Development (USAID) identified the telecommunications sector as one having potential for improving the high unemployment rate among young people in Kosovo. In this study, they found that the telecommunications sector firms imported skilled personnel because adequately trained personnel were difficult to find internally.

This stimulated a request for proposals from USAID's Higher Education Development (HED) branch to address this need. Given the University of Pittsburgh's long experience in the region (through its Russian and Eastern European Studies (REES) program, telecommunications education (through its iSchool) and international education (through the School of Education's Institute for International Studies in Education (IISE)), this RFP was a good fit, and was awarded this project in April 2008.

Thus, this project is designed to address two of Kosovo's pressing needs by assisting with the challenges of human resource

development and building a close industry-academia partnership in Kosovo's telecom sector. The ultimate goal of this partnership is to improve Kosovo's economy through private sector engagement and workforce development. As recent reports on the situation in Kosovo indicate (see [2]), much work remains to be done, and we can expect it to take many years to achieve self-sustaining growth.

Given USAID's emphasis on private sector investment, this program will build an education program that educates young people whose skills are consistent with the local industry's needs. This will be accomplished by building a modern laboratory and integrating laboratory experiences into the curriculum and through extensive engagement with the local industry through an Industry Advisory Council (IAC), which is a novel approach for the University of Pristina (UP).

Even in this relatively early stage of reconstruction, it is appropriate to introduce topics in the domain of iSchools into the educational system. While the UP faculty in this partnership are technology focussed, they are quite aware of their broader needs in the information professions.

2. Project description

There are three key elements to achieve our overarching objective. The first element is to develop and reinforce a relationship between local industry and UP's Faculty of Electrical and Computer Engineering. The next element is to demonstrate practice-oriented instruction by inviting UP faculty members to the University of Pittsburgh for extended stays. Finally we will work directly with the UP faculty in developing and delivering a program of study in telecommunications. Our specific goals for this three-year project are to:

- Work with the UP faculty on building an ongoing relationship with industry for the purpose of developing an intellectually rigorous telecommunications curriculum that meets the needs of industry in Kosovo.
- Help the UP faculty build the capability to respond to environmental changes (that is, changing industry needs and changing technologies) with appropriate curricular changes.
- Provide faculty members at UP with curriculum materials, instructional expertise, telecommunications laboratory equipment, and examples of hands-on laboratory experiences to supplement classroom education.
- Develop a student internship program at UP and negotiate internship experiences and opportunities with industry in Kosovo (and possibly elsewhere).

- Collaborate on providing classroom education for the first two cohorts of students to enroll under the new telecommunications curriculum.
- Develop a plan for continuing collaboration between the faculties and students of Pitt and UP after the project period ends.

The new program of study in telecommunications will be delivered through UP's Faculty of Electrical and Computer Engineering. In keeping with UP's strategy, this educational program must be aligned with the European Union's Bologna Process. As a result, UP currently offers three-year undergraduate degrees and two-year graduate degrees. The initial plans for the telecommunications program are focused on the two-year graduate degree. Graduate programs also require a thesis under Bologna, and, to offer a PhD in the future, the faculty must be actively engaged in research. Since UP's semesters run from late September to late January and from late February to June, there is a two-month period available for students to pursue full-time summer internship experiences.

The offices, classrooms, and some of the laboratory facilities for UP's telecommunications program are located in a building with the rest of the engineering faculty at some distance from the main campus. Another building that houses additional labs is located nearby, but is currently partially occupied by the Kosovo Defense Force. The conditions of the laboratory facilities for engineering students are variable. While laboratories to support computer programming instruction are typical of those found in most universities worldwide, the facilities in support of instruction in data networking and electronics are either limited or dated. Although computer programming and basic electronics instruction would not be addressed at the graduate level, the UP engineering laboratory facilities in their current state point to the limitations in hands-on experience that one would expect from students in the program. With no data routing equipment, the networking lab offers little capability for teaching students the fundamentals of data networking in an applied way. These problems regarding available educational facilities will need to be addressed by the project.

2.1 Faculty Development.

Professional education places different demands on a faculty and its facilities than traditional, theory-based education. Professors must engage students in a way that highlights the current practice of theoretical concepts, which requires active learning techniques supplemented with hands-on laboratory experiences. It is often beneficial to complement this classroom-based experience with internships or cooperative education. Professors engaged in professional education must also be mindful of the difference between "education" and "training". At Pitt, our goal is to provide sufficient practical skills so that our graduates will contribute to their employers quickly, while also having enough theoretical knowledge and background that they remain productive over the course of a career. This balance can sometimes be challenging to strike.

In our experience, faculty members whose background is not rooted in professional education often require retraining to help them adapt to a more practice-oriented approach. We propose to provide such training for the UP faculty by:

- Creating an Industry Advisory Council (IAC) consisting of representatives of current and emerging telecommunications

employers in Kosovo, who will be given an active role in providing feedback to the UP faculty on the curriculum. We are working with the IAC and the faculty to coach both groups in building this relationship by holding joint meetings three to four times per year, at a minimum, during the project period. The first such meeting was already held and was very promising. Engaging the IAC in such a detailed manner will create a sense of shared purpose that can assist UP students with job placement after their studies end.

- Working with UP faculty to educate them about learning outcomes-oriented curriculum design. Many faculty members outside of the field of education have learned the craft of teaching by observing their professors and mentors when they were students, and therefore are unfamiliar with the process of basing curriculum design on expected learning outcomes. To address this issue, we will engage curriculum design experts from the faculty of Pitt's School of Education to consult with the UP faculty as they review their curriculum. The goal is not to redesign the curriculum for them, but to help them through the process of accomplishing this themselves by providing constructive feedback, curriculum design examples, sample curriculum materials, and support in overcoming barriers along the way.
- Rotating three junior faculty members from UP's telecommunications program through Pitt's Master's of Science in Telecommunications and Networking (MST) program. These faculty members, to be selected in consultation with the UP leadership, will have the opportunity to earn credit toward a Pitt advanced degree; to participate in a summer internship experience with a U.S. company following the academic year spent at Pitt; and to experience the use of practice-oriented learning techniques. We will provide instruction in these techniques while the UP faculty members are resident in Pittsburgh, demonstrating how to incorporate labs into their courses and how to engage local industry more effectively.
- Educating the UP faculty regarding the process of continuous curriculum evaluation. The Graduate Telecommunications and Networking program at Pitt has undergone significant curriculum redesigns approximately every five years since its inception in 1986. The first redesign incorporated the growing importance of the Internet; the second added a PhD program; the third incorporated a new track of study in wireless, reflecting the increasing importance of those technologies in the late 1990s; and the fourth introduced a track in network security, in response to the changes in the post 9/11 world. Currently, the Pitt faculty are engaged in another redesign effort to move the focus of study in telecommunications away from the physical layer and more toward network management and applications, again reflecting changes in the industry. We will work with UP's faculty to pass on this culture of continuous curriculum evaluation and attention to industrial needs, as well as techniques for incorporating the discoveries from this process into their curriculum.

2.2 Curriculum Development.

To meet USAID's goals for this program, we plan to directly engage UP faculty and local industry as partners in curriculum development. As stated above, representatives of local industry in Kosovo will be organized into an Industrial Advisory Council (IAC), which will meet with the UP faculty three to four times per

year during the project period, and will be strongly encouraged by the project team to continue meeting beyond this three-year period as well. UP faculty will be engaged in the curriculum design process using a top-down approach, starting with the establishment of learning outcomes for the curriculum, and ultimately leading to the establishment of course syllabi and student evaluation instruments that are geared to learning outcomes. Junior faculty members from UP will be in residence at Pitt on a rotating basis to observe and participate in active and hands-on learning approaches, as mentioned above.

2.3 Private Sector Involvement.

Recruiting private sector representatives to the IAC was somewhat challenging in an environment with a limited or non-existent tradition of cooperation between academia and industry. Most IAC representatives came from Kosovo, since the goal is to educate students for the emerging Kosovar economy. The IAC members should be broadly representative of local industry, and should include participation by the incumbent telephone company (PTK), the competitive mobile service provider (iPKO), the larger and smaller Internet Service Providers (ISPs), and Community Access Television (CATV) providers, as well as broadcasters, satellite service providers, and the Telecommunications Regulatory Authority (ART, <http://www.art-ks.org/>). Other potential stakeholders consist of equipment and service vendors serving the local market; also, Cisco and Microsoft run training operations in Kosovo. Appendix 2 of the November 2007 USAID report Assessment of the Kosovo Information and Communication Technologies (ICT) Sector contains a list of contacts that were interviewed for the report, which was be a good starting point for recruitment of the IAC.

2.4 Practice-Oriented Education

The Graduate Telecommunications and Networking Program in SIS has an expressed purpose of preparing students for the workplace, with equal emphasis on theory and practice. Job placement rates have been very high since the program's inception in 1986. The program was founded with a grant from AT&T, and has since gathered formal and informal feedback from industrial partners through committees and one-on-one conversations, as well as through its own industrial advisory council. The program's current industrial advisory council includes representatives from service providers (e.g., Verizon), equipment manufacturers (e.g., Ericsson), application developers (e.g., Google), and end user organizations (e.g., FedEx). Our plan is to bring these experiences of practice-oriented education to UP as they establish a program of study in telecommunications.

Another significant feature of Pitt's telecommunications program has been its laboratory environments. Throughout the many curriculum and course content changes that have taken place, a persistent question has been: "What are the labs associated with this course?" We have built a substantial portfolio of lab experiences. These labs provide a structured tour for students through a sometimes complex environment, enabling them to discover for themselves what has been taught in the classroom. In the process, they begin to learn how to use and manage network equipment. While our portfolio of labs may not be the exact set that UP's faculty need, they will provide a foundation of workable, useful experiences for students that can be adapted to the Kosovo environment.

3. Project activities to date

In the months since the project has been awarded, we have made significant progress. At the project launch in Pristina, initial contact with industry representatives was made. These contacts have formed the basis for the IAC. In addition, an project coordinator in Kosovo was interviewed (and hired), and the first UP faculty member to visit Pittsburgh was identified. This faculty member is now in residence at Pitt.

The key UP faculty for this program visited Pittsburgh for a series of intensive meetings. During this week, the faculty were familiarized with Pitt's telecom program and the motivations that drive its structure and approach, as well as a deep familiarization with Pitt's laboratory environment. In addition, the UP faculty were introduced to objectives-oriented curriculum design by the IISE faculty. With this background, the UP faculty undertook a radical redesign of their curriculum, which resulted in a focussed set of educational experiences for their prospective students. In addition, this design enabled the UP faculty to develop a detailed set of laboratory requirements.

The redesigned curriculum, which is currently being fleshed out, is an adaption of Pitt's MST curriculum, not a wholesale adoption. The UP faculty face different requirements, in part because they are part of an engineering faculty. In addition, their curriculum must be carefully crafted to take advantage of the knowledge and skills of the incoming students. This results in a somewhat more technically oriented curriculum, because Pitt's MST program is designed for students with a greater variety of undergraduate degrees, not just electrical engineering or computer engineering.

Soon after their return to Pristina, the first meeting of the IAC was convened. After a formal opening, the IAC members and the faculty engaged in a frank and open dialog about the proposed curriculum. The faculty are considering the advice and will present a more detailed version of the curriculum to the IAC in the coming months before seeking the necessary approvals at UP. The advice offered by the IAC included some specific topics recommended for inclusion into the curriculum, a re-ordering of some courses, and a recommendation that the language of instruction be English. A significant fraction of the IAC members are graduates of UP's electrical engineering program and are currently with telecommunications carriers as well as large users of networks. Their familiarity with the curriculum as well as the industrial environment gave their recommendations additional weight.

Finally, an IISE faculty member travelled to Kosovo to conduct a baseline assessment. This assessment consisted of extensive questionnaires and interviews and will be useful for assessing the progress that the project made at the end of the three year period.

In the coming months, we will be finalizing UP's curriculum and constructing their labs. The graduate program in telecommunications at UP will begin with the Fall 2009 semester.

4. Conclusions

Supporting the UP faculty in building a practice oriented educational program in telecommunications has been personally and professionally rewarding. USAID has been a valuable partner for both their insight and the financial resources. The project team is hopeful that the successes in the telecommunications domain can be extended and repeated in other ares of interest to iSchools.

There are many factors that affect the success of a project like this. In this project, strong leadership from the Dean of the Faculty of Electrical and Computer Engineering has proven to be crucial, as has explicit support from UP's Vice Rectors. The Dean's personal reputation in the local industry has made creating the IAC easier, as many of the IAC members are alumni. In addition, the Dean's leadership has diminished the challenge the faculty faced when they were given 600 additional new students to teach this fall semester. External factors such as this can have an enormous impact but can also be managed with leadership.

This program offers mutual benefits beyond this particular project. The University of Pittsburgh's Center for Russian and East European Studies (REES) benefits from the richer contacts and experience in this region that this project offers. Students and faculty in Pitt's Telecommunications program have the opportunity to expand their experience base; further, it adds to the ongoing effort to explicitly introduce experience with international partners into students' experiences. This is an asset in the increasingly globalized economy.

While USAID's support was and continues to be critical in this project, we cannot count on this support in the long term. We expect the Master's program to be self-sustained by the end of the project period, as the faculty at UP will be at full strength. To expand the program into PhD education has further implications

and requires a different kind of partnership. First of all, some of the current faculty members will have to obtain PhDs themselves; secondly, our partnership will have to be expanded to include research relationships. Continuing the partnership in this way will require a different economic model; it is unclear whether USAID is the appropriate partner for such a project.

5. ACKNOWLEDGMENTS

Our thanks to USAID and HED for their support and our colleagues on the Faculty of Electrical and Computer Engineering at the University of Pristina for their commitment to working with us on this project.

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